DOCUMENT RESUME

ED 457 612 EC 308 618

AUTHOR	Campbell, Edward M.; Fortune, Jon; Heinlein, Ken B.
TITLE	Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States.
INSTITUTION	Wyoming State Dept. of Health, Cheyenne. Developmental Disabilities Div.
PUB DATE	2000-08-04
NOTE	42p.; Paper presented at the Annual World Congress of the International Association for the Scientific Study of Intellectual Disabilities (11th, Seattle, WA, August 1-6, 2000).
AVAILABLE FROM	Wyoming Division of Developmental Disabilities, Herschler Bldg., First Floor West, 122 West 25th Street, Cheyenne, WY 82002. Tel: 307-777-7115; Fax: 307-777-6047; e-mail: jfortu@state.wy.us; Web site: http://ddd.state.wy.us.
PUB TYPE	Reports - Research (143) -- Speeches/Meeting Papers (150)
EDRS PRICE	MF01/PC02 Plus Postage.
DESCRIPTORS	Adults; Community Programs; Cost Effectiveness; *Court Litigation; Developmental Disabilities; Federal Programs; *Financial Support; *Mental Retardation; Models; Policy Formation; *Predictor Variables; *State Aid; State Programs; *Supported Employment

ABSTRACT

This report investigated the financial expenditures of states for services for individuals with developmental disabilities and examined the factors that influenced the level of expenditure. Eight multiple-regression models are presented which explain 70 to 88 percent of the variation in states' total expenditures. In addition to the obvious relationships between spending for services for individuals with developmental disabilities and a state's total population and income, several additional factors were demonstrated to be important. Domestic migration was shown to have a significant negative relationship with spending; that is, states that are losing population have higher expenditures. History of litigation was also demonstrated to increase a state's spending. Providing supported living programs to a large number of people appears to have resulted in a substantial decrease in total spending. Increasing the numbers of people in any combination of ICF/MR and HCB waiver Medicaid services tended to increase spending. An alternative method of assessing fiscal effort is proposed and the concept of "alternative" services/supports of funding sources is questioned. Finally, a method for concurrently summarizing and displaying the effectiveness of delivering services and supports, and the cost-efficiency of providing those services/supports, is demonstrated. (Contains 25 references.) (CR)

Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 457 612

State of Wyoming

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

J. Fortune

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☑ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

Department of Health

Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States

Garry L. McKee, Ph.D., M.P.H., Director

August 4, 2000

EC 308618

BEST COPY AVAILABLE

State of Wyoming
Department of Health

Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States

Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States
is published by the
Wyoming Division of Developmental Disabilities
Robert T. Clabby, II, Administrator

Additional information and copies may be obtained from:
Jon Fortune, Ed.D.
Adult Services Manager
Wyoming Developmental Disabilities Division
Herschler Building, First Floor West
122 West 25th Street
Cheyenne, WY 82002
(307) 777-7115
(307) 777-6047 (Fax)
e-mail: jfortu@state.wy.us

This Document is available in alternative format upon request.

Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States

Edward M. Campbell

E=MC^2 Consulting, Inc.

Jon Fortune

Wyoming Health Department, Developmental Disabilities Division

Ken B. Heinlein

University of Wyoming, Wyoming Institute for Disabilities, UAP

11th World Congress of International Association for the Scientific Study of Intellectual Disabilities

August 4, 2000 S-480 Friday Evening Poster Session, Abstract A-164

Contact Author's Address: Edward M. Campbell, E=MC^2 Consulting, Inc.

502 East Missouri Avenue, Pierre, South Dakota 57501

Search Terms: Developmental Disabilities, Mental Retardation, Public Expenditures, Spending, Cost, Funding, Services, Supported Employment, Supported Living, Litigation, Fiscal Effort, SSI, Home and Community-Based, ICF/MR, Regional Comparisons, Administration, Policy, Alternative Services, Alternative Funding, Effectiveness, Cost Efficiency.

Running Head: TOTAL SPENDING MODEL

Eight Models for Explaining States' Total Spending for People with Developmental Disabilities in the United States

ABSTRACT

A relatively small national information set using geographic and population measures combined with the total expenditures described by Braddock and residential beds described by Lakin was used to build eight regression models. The models explain much of the variance in the states' total expenditures for services/supports for people with developmental disabilities. In addition to the obvious relationships between spending for DD and a state's total population and income, several additional factors were demonstrated to be important: Domestic migration was shown to have a significant negative relationship with spending; i.e. states, which are losing population, conversely have higher expenditures. History of litigation was also demonstrated to increase a state's spending. Providing supported living programs to a large number of people appears to result in a substantial decrease in total spending. Increasing the numbers of people in any combination of ICF/MR and HCB waiver Medicaid services tended to increase spending. An alternative method of assessing "fiscal effort" was proposed. The concept of "alternative" services/supports or funding sources was questioned. States do more and it costs more. However, they generally do not substitute a new type of service for an older mode. Finally, a method for concurrently summarizing and displaying the effectiveness of delivering services and supports, and the cost-efficiency of providing those services/supports was demonstrated. It is unlikely using all of the information in this study that a state could predict its likelihood to be involved in a waiting list lawsuit.

INTRODUCTION

Braddock's history of financial expenditures and Lakin's record of the residential services have been the twin towers of descriptive of research that dominate the empirical skyline in the field of developmental disabilities in the United States. The national system, serving over a half million individuals with developmental disabilities, had consumed 27.8 billion federal, state, and local dollars during 1996. But has there been a rhyme or reason to the costs for the supports and services that they received? Has there been a simple but powerful empirical relationship that can explain the variation in state offerings of residential facilities, and of the total dollars expended on all care for people with developmental disabilities in the United States? We think that it is possible to explain the variability, but not necessarily using the most conventional variables.

Previous work has equated spending with a state's commitment to serving people with mental retardation and developmental disabilities. However, money budgeted or spent has not necessarily related directly to a state's *effectiveness* in serving or supporting all those people who need or want services/supports. Nor, given an equal effectiveness in providing services/supports, has the cost *efficiency* with which those services were provided been given a great deal of attention. This paper attempts to develop methods, which can illuminate such issues.

The present paper demonstrates the relationships between the current information available for all states. It also illustrates the gaps in the data currently available; which, if filled, could greatly enhance the information available for policy planning. Finally, it is hoped that this paper will have some heuristic value in generating discussion and ideas for new research. In brief, the conceptual framework is as follows:

- The total expenditure is a function of the average amount spent per person, and of the number of people provided services/supports:
  - The amount spent per individual needs to find the delicate balance between niggardliness and extravagance, between inadequacy and wastefulness. However, there is yet no data sufficient to evaluate whether expenditures *per se* equate with quality of the services/supports provided.
  - The total number of people served is determined by the numbers of people needing services, and each State's policy when it comes to what proportion of those people it chooses to serve.

Eight multiple-regression models are presented which explain 70 to 88 percent of the variation in total expenditures. Examples of the expenditures predicted by these models, as well as the average of all eight models, are also listed.

LITERATURE REVIEW

Jacobson (1991) set forth the idea that the structural foundation for comprehensive community-based services was developed during the past two decades. Hemp (1992) found that in his 20-state survey covering the financing of community services that the states most often suggested funding flexibility, increased family supports, improved state government collaboration with local governments, and the creative use of "traditional" models. In New Zealand (Hand, 1994) has investigated the numbers, health status and service needs of people with mental retardation born before 1940 and identified their needs for services and potential changes in policy, responsibility, and funding. Conway in 1992 also addressed the emergence of Australian government policy related to people with intellectual disability and the resulting impact on those who live with its consequence. Campbell, Fortune, and Heinlein, in 1998, presented a method for measuring the outcomes of integration and independence. They made comparisons between funding packages and states regarding the effectiveness of programs in encouraging integration and independence. They

were also able to control for potentially confounding factors in three thousand adults with developmental disabilities. Braddock and Hemp (1997) identify reduced reliance on state institutions, reallocating funding, and developing community services and family supports in mental retardation services in Massachusetts using a New England region, the state of Michigan, and the United States as comparative frames of reference. The use of a national comparative database is rare.

Time and new policy have led to a growth in the United States of the Home and Community-Based (HCB) Waiver Program since its inception in 1981. By 1996, the number of HCBS recipients had risen to 190,230 (Prouty and Lakin, 1997). In 1996, HCBS had given a new latitude to allocate Medicaid institutional service dollars to pay for "alternative" community services and supports (Smith, Prouty & Lakin, 1996). West (1995) asserted that this new community brand of service is cost-effective when compared to traditional institutional or Intermediate Care Facility for the Mentally Retarded services. This is in the spirit of the effort called for by Lewis & Bruininks (1994) in an authoritatively researched chapter challenging the field to analyze and study what the costs and expenditures are for community services. Kim, Larson, & Lakin (1999) cite 30 studies from 1980 to 1999 that suggest that the new community programs help people develop new skills and reduce maladaptive behaviors. New alternatives such as cash subsidies in Michigan (Marcenko & Meyers, 1994) for families of children with severe developmental disabilities have emerged. These alternatives, reported by Smith (1994), are a new way to pay for supports. There is evidence that the new support paradigm is practical and affordable. New payment systems are being realigned in order to decouple dollars from traditional facility-specific, provider-specific, or service specific categories.

Smith (1999a) also mentions that new methods are being used in Wyoming to set individual resource allocations for HCB waiver participants. The Nebraska, South Dakota, and Wyoming state reimbursement methodologies are early attempts to achieve what Mitchell (1999) describes the need

for a payment system that pays providers more for individuals who are likely to need more care. A payment system like Wyoming DOORS needs to accurately predict the likely future costs a provider will incur in serving individuals. Gettings (1994) discusses the key challenges that states face in their attempts to design and implement service delivery systems that shift toward person-centered services and supports and broaden the financing options and incentives that are currently available. However, little attention has been given to the determinants of overall total spending. Campbell and Heal (1995) suggest that such explanations are vital to support large public expenditures. In this paper, we propose a simple conceptual framework for explaining why states differ in the amounts they spend on services for people with developmental disabilities.

In keeping with Cyert and Marc (1963, as cited in Braddock, Hemp, Parish and Westrich, 1998) and more recently Resource Mobilization Theory (Zald and McCarthy, 1987), surplus resources, in this case in the public sector, would encourage the development of new programs, innovation, and social change. In a test of this hypotheses, Braddock and Fujiura (1987) regressed state fiscal effort, defined as cumulative state funding for community based services per $1000 on state population, wealth, and proportion of federal funds in the MR/DD budget. The result was not statistically significant, explaining only 13 percent of the variance. In 1998, Braddock, et al., presented regression analyses that helped explain inter-state differences in the 20 year aggregate of Fiscal Effort by including in their model resource mobilization by advocacy organizations, institutional reform litigation via lawsuits, and participation in Home and Community Based Services Waiver (HCBS) Program. This model accounted for fifty-nine percent of the variance. The R^2s for each variable depended extensively on the Home and Community-Based Services Waiver (HCBS) (.175); but both Consumer Advocacy (.149) and Civil Rights (.143) played important parts. Surprisingly, the population (.029) and the wealth (.095) of each state have not consistently explained fiscal effort.

Though this is a respectable result, it seemed possible that a model built from less political variables might be more powerful.

METHOD

Data -

Data used were summary statistics for each of the 50 United States plus the District of Columbia. If data could not be obtained for all 51, they were not used. In order to avoid problems associated with regressing proportions, measures, which were proportions of one another, were not used, with HCBS reimbursement rates being the only exception. Service and expenditure data from 1996 for were obtained from several sources. Total expenditures for residential and community services for people with mental retardation and developmental disabilities were obtained from Braddock, et al. (1998). Smith (1997) furnished the numbers of people, receiving Home and Community-Based Services (HCBS), and residing in Intermediate Care Facilities for the Mentally Retarded (ICF/MR) in 1996. Prouty and Lakin, et al. (1997) were the source for numbers of people living in the following environments: Institutions (16+ beds – both public and private), Large Group Homes (7-15 beds), and Small Group Homes (1-6 beds). Proportions of the population aged 18 and up, with a diagnosis of mental retardation, and receiving Social Security payments from Old Age and Survivors Disability Insurance (OASDI) and/or Supplemental Security Income (SSI) were reported by the Center for Disease Control (Massey & McDermott, 1996). These proportions were multiplied by estimates of the adult (age 18+) general population of each state from the Bureau of the Census (1998) to yield an estimate of the numbers of adults with mental retardation who were receiving Social Security payments in each state (SSMR93). Geographic data for each state were also collected. Domestic and international migration estimates for 1996 were obtained from the U.S. Census Bureau's web site. The 1996 Federal Medical Assistance Percentage (FMAP) was furnished

by the Institute on Disability and Human Development (1997). Simple descriptive statistics summarizing these data are in Table 1.

Enter Table 1 about here.

States' total expenditures have a very wide range from very small states to very large. Additionally, preliminary analyses showed non-normal distributions of residuals from models using Total expenditures (TOTBUCK) from Braddock, *et al.* (1998) as the dependent measure. We therefore used the Log^{10} (TOTLOG) transformation of TOTBUCK as the dependent measure in the following analyses. Correlations between all of the independent measures are printed in Table 2; and it can be seen that most of these measures are highly correlated with each other. To aid in the comprehension of these relationships, the 22 independent measures were subdivided into six categories, which can seen in Tables 1 and 3. The six categories are ordered according to our perception of their "controllability":

Enter Table 2 about here.

Geographic measures also included the categorization of states into nine geographic regions based on the regional categories used by the Social Security Administration:

- New England (NE) - CT, MA, NE, NH, RI & VT
- Mid-Atlantic (MA) - NJ, NY & PA
- South Atlantic (SA) - DE, DC, FL, GA, MD, NC, VA & WV
- East South Central (ESC) - AL, KY, MS & TN

- East North Central (ENC) - -IL, IN, MI, OH, & WI
- West North Central (WNS) - IA, KS, MN, MO, NE, ND & SD
- West South Central (WSC) - AR, LA, OK & TX
- Mountain (MT) - AZ, CO, ID, MT, NV, NM, UT & WY
- Pacific (PS) - AK, CA, HI, OR & WA

Also included was a binary variable indicating whether or not a state had a history of litigation in the MR/DD field (LAWSUITX). This information is summarized by Braddock (1998). We took the liberty of adding CT & ID to the litigation list.

Procedure -

Simple Correlation coefficients between dependent and the independent measures were calculated. Hierarchical and "Blockwise" regressions were also run with TOTLOG as the dependent measure. The hierarchical regression entered each variable in the order listed in Table 1. The "blockwise" analysis used the same hierarchical regressions; but considered only the impact of each "block" of variables in explaining total spending. Six regression models were built from each group of independent variables using a stepwise selection procedure. Independent measures were entered into the model if their significance level was less than .50, but were allowed to stay only if $p<.10$. In order to select orthogonal predictors, those with tolerance levels less than .20, i.e. with $r > |.80|$, were eliminated one at a time, beginning with those with the least significant (largest p values).

Preliminary work suggested a negative exponential or asymptotic relationship between population-based predictors (numbers of people) with expenditures; i.e. spending rises rapidly as general population rises from the smallest to the medium-sized states, but increases at a much slower rate between the largest states. Adding the squares of those predictors provided a much better fit to the data. This was done only if: 1)it did not eliminate any predictors selected above; and 2) the R^2

was increased substantially. All eight regions were "forced" into Model 1 *after* implementing the selection methods outlined above.

In an effort to examine states' *effectiveness* in providing services/supports to all those needing or wanting them, we summed the total number of people receiving residential services in: 1) facilities over 16 beds, 2) 7-15 beds, 3) 1-6 beds, and 4) those receiving supported living (TOTBEDS) was transformed to the Log^{10} (BEDLOG). Using the nine regions and GENPOP, SSMR93, SEVDIS, and DOMMIG as independent measures we used the same stepwise regression techniques outlined earlier, with BEDLOG as the dependent variable. SSMR93 was the independent measure selected. In keeping with the previous procedures, we then eliminated the other non-regional measures, added the square of SSMR93, and resubmitted the independent measures to the stepwise selection. Those regions that met the selection criteria were left in the model.

In an analogous attempt to gauge cost *efficiency*, we then used the TOTBED and TOTBED2 (Square of TOTBED) measures, in conjunction with the nine regions, as the variables used to predict total expenditures (TOTLOG). Again, only those regions selected by the stepwise procedure were kept in the model.

RESULTS

Correlation coefficients between all of the independent measures are presented in Table 2. Correlation coefficients of all predictor variables with both TOTBUCK and TOTLOG are presented in Table 3. As may be expected, General Population is significantly and positively correlated with spending. All other population (numbers of people) measures were also significantly and positively related to spending: 1) numbers of people with disabilities (SSMR93 & SEVDIS); 2) numbers of people in daytime settings; 3) numbers of people in residential settings; and 4) numbers of people

funded by ICF/MR and HCBS. The economic measures (INCOME and POVERTY) were also positively related to spending. These population and economic measures are all highly related to General Population, as are the regional correlation coefficients. Migration statistics also demonstrated significant correlation coefficients with spending. Domestic migration was negatively related to spending, whereas international migration was positively related. The Federal Medical Assistance Percentage (FMAP) was negatively related to TOTBUCK; although the coefficient with TOTLOG was not significant.

Enter Table 3 about here.

Hierarchical Regressions. However, correlation coefficients do not indicate how each independent measure interacts with the other predictors in explaining spending. Therefore, hierarchical regressions were conducted by adding each measure sequentially as listed in Table 3. Geographical region was entered by constructing eight binary "dummy" variables for each region. Since one "dummy" variable needed to be excluded, New England was chosen, as it was the median on total expenditures. Individual measures which significantly increased the R^2 from the previous model's R^2 were: 1) Region, 2) General Population, 3) International Migration, 4) Personal Income, 5) FMAP, 6) Number receiving supported employment, 7) Number living in small (1-6 bed) group homes, and 8) Number funded by HCBS. When considering each group of predictors in a "blockwise" analysis, the blocks which contributed significantly to prediction of total spending were: 1) Geographic measures, 2) Economic measures, and 3) Residential settings.

Stepwise Regressions. The six models which were formulated from each block or group of independent variables are presented in Tables 4a–3f. The predicted values generated by each model were converted from the Log^{10} values, and are illustrated in Tables 5a and 5b.

Insert Tables 4a and 4b about here.

Model 1 (Geographic Measures) is shown in Table 4a. Predictors selected were: 1) Regions, 2) General Population, and 3) Domestic Migration. Regions were entered after the stepwise selection to illustrate their effects. However, an analysis of covariance, using the other measures in the model as covariates, failed to demonstrate a significant Type III effect of region (F=1.69); i.e. accounting for population and domestic migration, regional differences were not significant. Introduction of regional measures did not effect the following findings for general population and domestic migration. As might be expected, general population explains a large amount of the variance in spending. However, the Adjusted R^2 of .8476 for this model still leaves over 15% of the variation unexplained. The role of international migration is not clear. It showed a positive simple correlation with spending, but a negative relationship in the hierarchical regression. More importantly, domestic migration proved to be a more powerful predictor of spending in the stepwise procedure. In all analyses domestic migration demonstrated a significant negative influence upon spending. States that are losing population also experience a larger financial burden in paying for services for people with developmental disabilities.

Model 2 is presented in Table 4b. "Social/Political" Predictors selected were: 1) Numbers of people with severe disabilities (SEVDIS), and 2) History of litigation. SEVDIS is positively related to total spending. Again this is expected as it is highly related to general population. History of litigation was also shown to be positively related to total spending. Controlling for numbers of severely disabled people, states that have experience of litigation have higher expenditures.

Insert Tables 4c and 4d about here.

Model 3 (Economic variables) is displayed in Table 4c. Personal income was the only economic measure selected by the stepwise procedure. Again this is expected, as total personal income is highly related to general population, as well as poverty rates. Although FMAP added significantly to prediction in the hierarchical regression (Table 3), it was not selected by the stepwise procedure. The role of FMAP is also unclear in that it showed a negative correlation; but a positive relationship in the hierarchical regression. The model does demonstrate, however, a significant relationship between total expenditures and total personal income. Braddock's (1998) "Fiscal Effort" measure is a ratio of these two measures. We attempted to construct a similar statistic: The proportion of the predicted to actual expenditures was calculated, and is presented in Table 5a. The correlation coefficient between this statistic and "Fiscal Effort" was found to be significant: r=-0.58 (p<.0001).

Model 4 (Daytime settings) is displayed in Table 4d. When the independent measures were entered without their squared values, the DAYWORK measure was not selected. The model was then recalculated with the squares of the remaining measures included. The numbers of people in state institutions and in supported employment programs both add to a state's total expenditures. State institution numbers added more than supported employment, as evidenced by the parameter estimates. *Post hoc* tests were conducted as follows:

- The numbers of people in each of the three programs were summed.
- The number in each program was divided by this sum to yield a proportion for each program; e.g., a state might have .10 for institutions, .75 for day/work programs, and .15 for supported employment.

- For each program, states were grouped into quartiles; e.g. a state with a supported employment proportion below .10 would be in the bottom quartile, while one above .22 would be in the top supported employment quartile.
- Our null hypothesis was that, controlling for the effects of the independent measures from the previous blocks (Models 1-3), that there were no differences in spending between the top and bottom quartiles.
- Three analyses of covariance were conducted, with quartile groups as the classification variable. Covariates were the independent measures listed in Models 1-3.
- No significant differences were between either the institution or the day/work quartile groups.
- However, total expenditures were found to be significantly higher for states in the top quartile in supported employment as compared to those in the bottom quartile. All things being equal, states with more than 22% of their people receiving supported employment spent more than those states with fewer than 10% (t=2.146, p<.05).

Insert Tables 4e and 4f about here.

Model 5 (Residential settings) can be seen in Table 4e. All four candidate measures were selected by the stepwise procedure. Although adding squares of any measure increased the adjusted R^2, doing so removed other measures from the model. Therefore, it was decided to not use the squares of any of the measures in this mode. The parameter estimates illustrate the influence of each measure:

- Numbers of people in large (16+ beds) has the greatest impact on total expenditures.
- Numbers in large (7-15 beds) and small (1-6 beds) facilities also increase expenditures, but to a lesser extent.

- Finally, it appears that a greater number of people receiving supported living has the effect of reducing total expenditures.

Post Hoc tests were conducted in a manner analogous to the procedure used for daytime settings in Model 4. Analyses of covariance used the same covariates as before, i.e. the independent measures from Models 1-3. Controlling for the effects of those covariates, no significant differences were found between the quartile groups for institutions, nor large or small residential facilities. Similarly to supported employment, there was a significant difference between total spending for states in the top quartile in supported living when compared to those in the bottom quartile. However, this result was in the opposite direction. States with more than 24% of their total residential recipients getting supported living spent significantly less than those with fewer than 5% (t=-2.043, p<.05).

Model 6 (Funding measures) is illustrated in Table 4f. The numbers of people in ICF/MR and HCBS programs both increase a state's total expenditures, as does the reimbursement rate paid for HCBS services. *Post hoc* analyses, similar to those done for models 4 and 5, were conducted, but failed to find any significant differences.

Insert Tables 5a and 5b about here

The Predicted Values generated by Models 1-6 are converted back from their Log10 transformations and presented in Tables 5a and 5b. The "Combined" models, i.e. the arithmetic means of predicted values generated from Models 1-6 are presented in Table 5b. This mean was divided by the actual expenditure, to yield a percentage. The percentages range from 48% (Connecticut) to 260% (Hawaii). The six models generated average predicted values for

Connecticut approximately one half of its reported expenditures. For Hawaii, the models predicted expenditures about 245% greater than reported.

Insert Table 6 about here.

The models, which were constructed to examine efficiency and effectiveness, are shown in Tables 6a and 6b, respectively. The total number of people receiving any kind of residential service, ranging from facilities over 16 beds to supported living, predicted 86% of the variation in total expenditures (Table 6a). This model adjusts for lower expenditure levels in the Pacific, Mountain, and West North Central regions. In turn, 80% of that number of people with residential services, is explained by the number of people with mental retardation receiving Social Security payments, with consideration given to higher numbers in the West North Central, and lower numbers in the South Atlantic and East South Central regions. The residual values from these two models were combined into a single dataset, and are plotted in Figure 1. The residuals from Model 7 (Table 6a) are plotted along the horizontal axis; and those from Model 8 (Table 6b) are plotted on the vertical axis. Values are displayed in Log^{10} units. Wisconsin and Connecticut are most effective in providing residential services/supports to the highest number of people in relation to the numbers predicted by Model 8 (Table 6b). Wisconsin also demonstrates the highest cost efficiency when gauged by Model 7 (Table 6a).

Insert Figure 1 about here.

DISCUSSION

As may be expected, general population and its correlates, personal income, and numbers of people with severe disabilities, are all highly related to a state's MR/DD expenditures. The purpose behind our current methodology was to first identify the obvious relationships before investigating those that may be less obvious. These methods avoid the confusion that can occur when regression techniques are applied to ratios and proportions. Of more interest is the surprisingly low adjusted R^2, which was found for region and general population in the hierarchical regression (0.7368). This leaves more than 26% of the variance in expenditures unexplained. We feel that the present results substantially help to explain much of the remaining variation.

By adding measures to those which can be assumed to strongly predict total spending, relationships which are less strong, but still significant can be illuminated. For example, history of litigation did not appear to be significant when looking at the simple correlation coefficients nor the results of the hierarchical regression. However, when added to the severe disability numbers in the Social/Political model, a significant positive relationship to spending was demonstrated. This somewhat corroborates the findings of Smith (1999c) who found that history of litigation was highly related to HCBS reimbursement rates. In turn, the present study showed that HCBS reimbursement rates significantly affect total spending.

Migration trends also present an interesting picture. Domestic migration was significantly, but negatively, related to total spending in both the simple correlation coefficients and in the "Geographic" Model (Model 1). The negative relationship of spending to domestic migration might be understood by the migration of retirement-age people to warmer climates. If one assumes that their adult children with disabilities do not tend to migrate with their parents, an increased need for residential services would be the likely result, as well as a reduced population and tax base. The role

of international migration is less clear. Although it shows a strong positive correlation to spending, it has a negative parameter estimate when entered into the hierarchical regression.

Model 3 suggests an alternative method of calculating a "Fiscal Effort" statistic, somewhat similar to that used by Braddock (1998). The present model uses the square of personal income to adjust for the non-linear nature of the relationship between income and total spending. We also used a $\log^{10}$ transformation of the total expenditure measure. After these modifications, our measure demonstrated a correlation coefficient of -0.58 with Fiscal Effort.

Daytime setting (Model 4) analyses confirmed a basic notion that the more people that are provided services/supports, the more money is spent. Adding people in any of the three categories results in greater expenditures. Community day/work programs were not kept in the model, and state institutions and supported employment programs both had increased expenditures. It might therefore be concluded that community day/work programs are cheaper to operate than either institutions or supported employment programs. The only significant *post hoc* analysis showed significantly higher expenditures among states with a large proportion of people in supported employment programs. Any conclusions resulting from this finding must be tempered by the substantial benefits of helping people to get genuine, paying jobs.

Residential setting (Model 5) analyses again illustrated that increasing the numbers of people in any congregate setting, regardless of size, increases spending. However Model 5 parameter estimates, and the results of the *post hoc* tests, both confirm that increasing the numbers of people in supported living decreases total expenditures. This result suggests that it would be most advantageous for states to greatly expand their programs of supports for people living in their own or family homes.

Funding source (Model 6) conclusions were similar to those for most of the other models, i.e. the more people who are provided services/supports; the more money is spent. Although this might seem to be overly obvious, many of the services/supports investigated are widely considered to be alternatives to each other; e.g. day/work programs are alternatives to institutions, and supported employment is an alternative to day/work. Likewise, HCBS is considered to be an alternative to ICF/MR. On the other hand, an examination of the correlation coefficients between these alternatives shows that they are all positive and highly significant. For example, states which have high HCBS utilization also have relatively large numbers of people in ICFs/MR ($r=.615$, $p<.0001$). In other words, the concept of alternatives seems to be ill founded. It appears that alternatives to higher-cost placements expand the array of placement options, rather than displacing the high-cost options.

Interestingly when the seven states with waiting list lawsuits in the year 2000 are compared to their various rankings in all of the tables it can be quickly seen that they are scattered throughout the list. Florida, Hawaii, Massachusetts, New Hampshire, New Jersey, Pennsylvania, and Washington vary a great deal in the variables in this study. An analytical brilliancy from Smith (1999b) suggests using the ratio of number of people receiving residential or HCBS services in the family home per 100,000 persons in the general population capacity to known number of people waiting for residential services. He suggests that when a state's system capacity was less than 200 per 100,000 population the state was more likely to have a waiting list and the relative size of the waiting list appeared to grow larger than the smaller the state's relative capacity. At this point none of the measures used in this study can really explain how likely a state is to face litigation in the United States from people waiting for services.

The foregoing discussion leads to the hypothesis that the major factor in determining expenditures is the **total** number of people a state elects to serve; and not necessarily where they are served. Of course, this total number is partially a function of the number of people needing and wanting services/supports in a given state. Unfortunately, that actual number is extremely difficult to ascertain. Accurate waiting list data would be most useful in assessing the effectiveness of each state in meeting this need for services/supports. Credible waiting list data are not currently available for all 51 states. That is why it was not included in the present study. When such data do become available, they should be incorporated into analyses similar to those presented here. They might provide a much better insight into the determinants of spending by each state.

Caveats

The *effectiveness x efficiency* display in Figure 1 is an attempt to illustrate a new way of looking at these concepts. They are based on 1996 data; and are not necessarily reflective of the current situation. Figure 1 does not take into account *where* people are being served, nor the *appropriateness, adequacy, or quality* or those services/supports. It can not be safely concluded that a given state is under- or over-expending simply based on these predicted values. More reliable and accurate predictor data are needed, followed by more sophisticated analyses than has been presented here.

None of these data appear to have any direct connection to quality of service, nor to the "quality of life" of the people served. It is also not likely that such information will be available on a national basis in the near future. Measures need to be developed that reflect and recognize **genuine efficiencies** in a state's method of providing services and supports. Finally, attention could also be given to the *equitability* of a state's funding system; i.e. to what extent are reimbursements for

services/supports based on the needs of each individual? Or are expenditures keyed more to sustaining "traditional" services and/or agencies, or to political expediencies?

Table 1.
Simple Descriptive Statistics for 1996 Data.

Variable	Label	Mean	Std Dev	Minimum	Maximum
Dependent Measures					
TOTBUCK	Total Spending	446666421	607375914	34952272	3407701732
TOTLOG	Log10 of Total Spending	8.40	0.47	7.54	9.53
Geographic Measures					
NE	New England	0.12	0.47	0.00	1.00
MA	Mid Atlantic	0,06	0.24	0.00	1.00
SA	South Atlantic	0.18	0.39	0.00	1.00
ESC	East South Central	0.08	0.27	0.00	1.00
ENC	East North Central	0.10	0.30	0.00	1.00
WNC	West North Central	0.14	0.35	0.00	1.00
WSC	West South Central	0.08	0.27	0.00	1.00
MT	Mountain	0.16	0.37	0.00	1.00
PA	Pacific	0.10	0.30	0.00	1.00
GENPOP	General Population/100k	51.80	57.70	4.80	317.22
DOMMIG	Domestic Migration	-454.71	57152.36	-258915.00	101450.00
INTMIG	International Migration	16777.80	40055.93	320.00	246376.00
Social/Political Measures					
SSMR93	OASDI/SSI MR Adults	25303.82	23738.14	1046.52	103359.98
SEVDIS	Severe Disabilities	459582.69	485447.79	25142.00	2353281.00
ARC	Arc Membership	3466.80	8670.78	51.00	61958.00
LAWSUITX	History of Litigation?	0.55	0.50	0.00	1.00
Economic Measures					
INCOME	Personal Income /$1M	122722.18	144178.08	10051.00	780526.00
POVERTY	Poverty % x Pop.	712082.69	939724.92	45962.98	5329271.98
FMAP	Federal Medical Ass't Pct	60.21	8.62	50.00	78.20
Daytime Settings					
SUPTEMPN	Supported Employment	1779.31	2116.71	0.00	9882.00
DAYWORK	Total in Day/Work	8881.47	12600.91	394.00	73049.00
INST	State Instit ADP	1171.10	1330.92	0.00	5517.00
Residential Settings					
INSTITUT	Total 16+ Beds	1869.47	2204.52	0.00	9147.00
BIGHOMES	7-15 Bed Group Homes	1105.67	2491.70	0.00	17562.00
SMALHOME	1-6 Bed Group Homes	3383.31	4944.34	421.00	31804.00
SUPTLVG	Supported Living	1132.41	1756.22	0.00	10782.00
Funding Measures					
ICFFOLKS	Number ICF/MR Residents	2539.67	3214.28	15.00	13224.00
HCBFOLKS	Number HCBS Participants	3819.59	5553.54	0.00	29314.00
PERDIEM	State Institution Per Diem	272.51	129.40	0.00	693.00
ICFRATE	ICF/MR $ per Participant	86537.64	37815.68	40591.25	206073.33
HCBSRATE	HCBS $ per Participant	27486.35	11460.62	0.00	48282.53

Table 2.
Pearson Correlation Coefficients Between All Independent Measures / N = 51

	GENPOP	DOMMIG	INTMIG	SSMR93	SEVDIS	ARC	LAWSUIT	INCOME	POVERTY	FMAP	SUPTEMP	DAYWORK	INST
GENPOP	1.00	**-0.54**	**0.90**	**0.91**	**0.98**	**0.51**	0.12	**0.99**	**0.98**	**-0.29**	**0.76**	**0.76**	**0.84**
DOMMIG	**-0.54**	1.00	**-0.67**	**-0.44**	**-0.49**	**-0.64**	-0.26	**-0.60**	**-0.55**	**0.31**	**-0.59**	**-0.72**	**-0.41**
INTMIG	**0.90**	**-0.67**	1.00	**0.70**	**0.85**	**0.52**	0.13	**0.91**	**0.93**	**-0.32**	**0.62**	**0.71**	**0.68**
SSMR93	**0.91**	**-0.44**	**0.70**	1.00	**0.95**	**0.52**	0.06	**0.89**	**0.88**	-0.12	**0.72**	**0.78**	**0.81**
SEVDIS	**0.98**	**-0.49**	**0.85**	**0.95**	1.00	**0.55**	0.10	**0.97**	**0.96**	-0.24	**0.75**	**0.80**	**0.84**
ARC	**0.51**	**-0.64**	**0.52**	**0.52**	**0.55**	1.00	0.17	**0.57**	**0.52**	-0.25	**0.68**	**0.83**	**0.42**
LAWSUITX	0.12	-0.26	0.13	0.06	0.10	0.17	1.00	0.13	0.13	-0.08	**0.32**	0.18	-0.05
INCOME	**0.99**	**-0.60**	**0.91**	**0.89**	**0.97**	**0.57**	0.13	1.00	**0.96**	**-0.36**	**0.78**	**0.82**	**0.84**
POVERTY	**0.98**	**-0.56**	**0.93**	**0.88**	**0.96**	**0.52**	0.13	**0.96**	1.00	-0.19	**0.70**	**0.76**	**0.80**
FMAP	-0.29	**0.31**	**-0.32**	-0.12	-0.24	-0.25	-0.08	**-0.36**	-0.19	1.00	**-0.37**	**-0.30**	-0.21
SUPTEMPN	**0.76**	**-0.59**	**0.62**	**0.72**	**0.75**	**0.68**	**0.32**	**0.78**	**0.70**	**-0.37**	1.00	**0.89**	**0.60**
DAYWORK	**0.79**	**-0.72**	**0.71**	**0.78**	**0.80**	**0.83**	0.18	**0.82**	**0.76**	**-0.30**	**0.89**	1.00	**0.65**
INST	**0.84**	**-0.41**	**0.68**	**0.81**	**0.84**	**0.42**	-0.05	**0.84**	**0.80**	-0.21	**0.60**	**0.65**	1.00
INSTITUT	**0.87**	**-0.45**	**0.70**	**0.83**	**0.86**	**0.36**	-0.01	**0.85**	**0.83**	-0.18	**0.65**	**0.86**	**0.93**
BIGHOMES	**0.49**	**-0.62**	**0.48**	**0.53**	**0.53**	**0.95**	0.12	**0.54**	**0.49**	-0.19	**0.66**	**0.71**	**0.41**
SMALHOME	**0.84**	**-0.71**	**0.84**	**0.71**	**0.78**	**0.45**	0.22	**0.85**	**0.81**	**-0.33**	**0.76**	**0.71**	**0.55**
SUPTLVG	**0.71**	**-0.60**	**0.78**	**0.58**	**0.64**	**0.31**	0.10	**0.72**	**0.73**	-0.23	**0.57**	**0.59**	**0.49**
ICFFOLKS	**0.84**	**-0.49**	**0.66**	**0.85**	**0.85**	**0.56**	0.05	**0.83**	**0.81**	-0.16	**0.72**	**0.79**	**0.87**
HCBFOLKS	**0.82**	**-0.75**	**0.88**	**0.69**	**0.79**	**0.76**	0.16	**0.85**	**0.83**	**-0.33**	**0.75**	**0.85**	**0.57**
PERDIEM	0.00	-0.12	0.02	-0.02	-0.02	0.09	0.11	0.02	-0.01	-0.04	0.17	0.09	-0.10
ICFRATE	-0.18	-0.11	-0.06	-0.23	-0.18	**0.29**	0.27	-0.12	-0.18	**-0.37**	0.02	0.05	-0.20
HCBSRATE	-0.09	-0.04	-0.16	-0.08	-0.08	0.12	0.26	-0.06	-0.14	-0.20	0.24	0.06	-0.09

	INSTITUT	BIGHOMES	SMALHOME	SUPTLVG	ICFFOLKS	HCBFOLKS	PERDIEM	ICFRATE	HCBSRATE
GENPOP	**0.87**	**0.49**	**0.84**	**0.71**	**0.84**	**0.82**	0.01	-0.18	-0.09
DOMMIG	**-0.45**	**-0.62**	**-0.71**	**-0.60**	**-0.49**	**-0.75**	-0.12	-0.11	-0.04
INTMIG	**0.70**	**0.48**	**0.84**	**0.78**	**0.66**	**0.88**	0.02	-0.06	-0.16
SSMR93	**0.83**	**0.53**	**0.71**	**0.58**	**0.85**	**0.69**	-0.02	-0.23	-0.08
SEVDIS	**0.86**	**0.53**	**0.78**	**0.64**	**0.85**	**0.79**	-0.02	-0.18	-0.08
ARC	**0.36**	**0.95**	**0.45**	**0.31**	**0.56**	**0.76**	0.09	**0.29**	0.12
LAWSUITX	-0.01	0.12	0.22	0.10	0.05	0.16	0.11	0.27	0.26
INCOME	**0.85**	**0.54**	**0.85**	**0.72**	**0.83**	**0.85**	0.02	-0.12	-0.06
POVERTY	**0.83**	**0.49**	**0.81**	**0.73**	**0.81**	**0.83**	-0.01	-0.18	-0.14
FMAP	-0.18	-0.19	-0.33	-0.23	-0.16	**-0.33**	-0.04	**-0.37**	-0.20
SUPTEMPN	**0.65**	**0.66**	**0.76**	**0.57**	**0.72**	**0.75**	0.17	0.02	0.24
DAYWORK	**0.69**	**0.86**	**0.71**	**0.59**	**0.79**	**0.85**	0.10	0.05	0.06
INST	**0.93**	**0.41**	**0.55**	**0.49**	**0.87**	**0.57**	-0.10	-0.20	-0.09
INSTITUT	1.00	**0.61**	**0.63**	**0.57**	**0.91**	**0.59**	-0.09	-0.31	-0.12
BIGHOMES	**0.61**	1.00	**0.38**	**0.36**	**0.60**	**0.71**	0.09	0.23	0.04
SMALHOME	**0.63**	**0.38**	1.00	**0.78**	**0.59**	**0.85**	0.14	-0.08	0.01
SUPTLVG	**0.57**	**0.36**	**0.78**	1.00	**0.47**	**0.71**	0.15	-0.08	-0.07
ICFFOLKS	**0.91**	**0.60**	**0.59**	**0.47**	1.00	**0.62**	-0.05	-0.24	-0.08
HCBFOLKS	**0.59**	**0.71**	**0.85**	**0.71**	**0.62**	1.00	0.08	0.11	-0.03
PERDIEM	-0.09	0.09	0.14	0.15	-0.05	0.08	1.00	0.03	0.21
ICFRATE	**-0.31**	0.23	-0.08	-0.08	-0.24	0.11	0.03	1.00	0.41
HCBSRATE	-0.12	0.04	0.01	-0.07	-0.09	-0.03	0.21	0.41	1.00

Correlation coefficients which differ significantly from zero, at least the $p<.05$ level, are in **bold type**.

Table 3.
Correlation Coefficients and Multiple Regressions of Independent Variables on Total Expenditures.

Independent Measures	Correlations (r) with		Multiple Regressions on TOTLOG - Adjusted R^2	
	TOTBUCK	TOTLOG	Blockwise	Hierarchical
Geographic Measures			**0.7983**	
Regions (df=8):				**0.3034**
New England	-0.07	-0.05		
Mid-Atlantic	**0.58**	**0.42**		
South Atlantic	-0.11	-0.01		
East South Central	-0.12	-0.08		
East North Central	-0.18	**0.33**		
West North Central	-0.12	-0.08		
West South Central	0.01	0.11		
Mountain	-0.23	**-0.37**		
Pacific	0.10	-0.08		
General Population	**0.85**	**0.80**		**0.7368**
Domestic Migration	**-0.75**	**-0.41**		0.7373
International Migration	**0.78**	**0.57**		**0.7983**
Social/Political			0.7924	
Soc Sec w. MR (1993)	**0.81**	**0.83**		0.7932
Sev Disability # (Census)	**0.85**	**0.82**		0.7896
Arc Membership	**0.83**	**0.52**		0.7977
History of Litigation?	0.22	0.18		0.7924
Economic Measures			**0.8564**	
Personal Income	**0.89**	**0.81**		**0.8303**
Poverty Percentage	**0.82**	**0.72**		0.8254
Fed. Med. Ass't. Pct.	**-0.35**	-0.26		**0.8564**
Daytime Settings			0.8678	
Supported Employment #s	**0.89**	**0.81**		**0.8722**
Day/Work Numbers	**0.95**	**0.75**		0.8714
State Institution #s	**0.73**	**0.78**		0.8678
Residential Settings			**0.8986**	
16+ Beds	**0.73**	**0.78**		0.8694
7-15 Beds	**0.80**	**0.52**		0.8768
1-6 Beds	**0.79**	**0.68**		**0.9015**
Supported Living	**0.61**	**0.48**		0.8986
Funding Measures			0.9205	
# ICF/MR Participants	**0.81**	**0.79**		0.8961
# HCBS Participants	**0.89**	**0.68**		**0.9197**
State Institution Per Diem	0.10	-0.00		0.9180
ICF/MR $ per Participant	0.09	-0.10		0.9241
HCBS $ per Participant	0.09	0.09		0.9205

Notes: 1) **Names** of variables used in Models 1-6 are shown in **bold type**.
2) Correlation coefficients which differ significantly from 0 at the .05 level are in **bold type**.
3) R^2s greater than the R^2 for the previous variable/block are shown in **bold type**.

Table4a.
Model 1: Independent Variables – General Population and Domestic Migration.
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	11	9.57638	0.87058	26.289	0.0001
Error	39	1.29154	0.03312		
C Total	50	10.86791			

Root MSE	0.18198	R-square	0.8812
Dep Mean	8.39585	**Adj R-sq**	**0.8476**
C.V.	2.16749		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.991592	0.08448785	94.589	0.0001	Intercept
MA	1	-0.393780	0.18742301	-2.101	0.0422	Mid Atlantic
ENC	1	-0.236537	0.13399479	-1.765	0.0853	East North Central
PA	1	-0.293557	0.11701764	-2.509	0.0164	Pacific
WSC	1	-0.154586	0.12397340	-1.247	0.2199	West South Central
SA	1	-0.211762	0.10167008	-2.083	0.0439	South Atlantic
WNC	1	-0.082624	0.10142067	-0.815	0.4202	West North Central
ESC	1	-0.272051	0.12010386	-2.265	0.0291	East South Central
MT	1	-0.234707	0.10179120	-2.306	0.0265	Mountain
GENPOP	1	**0.016603**	0.00198811	8.351	0.0001	**General Populatn/1M**
GENPOP2	1	-0.000044188	0.00000807	-5.474	0.0001	General Population^2
DOMMIG	1	**-0.000002659**	0.00000089	-2.987	0.0049	**Domestic Migration**

Table 4b.
Model 2: Independent Variables – "Social/Political" - Numbers of People with Severe Disabilities and History of Litigation
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	3	8.67086	2.89029	61.830	0.0001
Error	47	2.19706	0.04675		
C Total	50	10.86791			

Root MSE	0.21621	R-square	0.7978
Dep Mean	8.39585	**Adj R-sq**	**0.7849**
C.V.	2.57518		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.768074	0.06698337	115.970	0.0001	Intercept
SEVDIS	1	0.000001638	0.00000018	9.194	0.0001	Severe Disabilities #
SEVDIS2	1	-4.6861E-13	0.00000000	-5.161	0.0001	Severe Disab. Squared
LAWSUITX	1	**0.150016**	0.06208450	2.416	0.0196	**History of Litigation?**

Table 4c
Model 3: Independent Variables – Economic (Personal Income).
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	2	8.78925	4.39463	101.480	0.0001
Error	48	2.07866	0.04331		
C Total	50	10.86791			

Root MSE	0.20810	R-square	0.8087
Dep Mean	8.39585	**Adj R-sq**	**0.8008**
C.V.	2.47860		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.884931	0.04925464	160.085	0.0001	Intercept
INCOME	1	0.000005573	0.00000052	10.661	0.0001	Personal Income/$1M
INCOME2	1	-4.88044E-12	0.00000000	-6.124	0.0001	Personal Income Squared

Table 4d.
Model 4: Independent Variables – Daytime Settings (State Institution Average Daily Population vs. Numbers of People in Supported Employment)
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	4	9.58637	2.39659	86.023	0.0001
Error	46	1.28155	0.02786		
C Total	50	10.86791			

Root MSE	0.16691	R-square	0.8821
Dep Mean	8.39585	**Adj R-sq**	**0.8718**
C.V.	1.98803		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.826962	0.04387740	178.383	0.0001	Intercept
INST	1	**0.000355**	0.00005474	6.493	0.0001	**State Instit ADP**
INST2	1	-4.624304E-8	0.00000001	-4.167	0.0001	State Inst ADP Squared
SUPTEMPN	1	**0.000225**	0.00003457	6.511	0.0001	**Supported Employment**
SUPTEMP2	1	-1.377439E-8	0.00000000	-3.474	0.0011	Supported Emply Squared

Table 4e.
Model 5: Independent Variables – Large (16+ Beds) vs. Small (1-6) Residences.
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	4	7.88586	1.97147	30.411	0.0001
Error	46	2.98205	0.06483		
C Total	50	10.86791			

Root MSE	0.25461	R-square	0.7256
Dep Mean	8.39585	**Adj R-sq**	**0.7017**
C.V.	3.03259		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	8.065631	0.04763169	169.333	0.0001	Intercept
INSTITUT	1	**0.000119**	0.00002192	5.410	0.0001	**Total 16+ Beds**
BIGHOMES	1	**0.000039771**	0.00001606	2.477	0.0170	**7-15 Bed Group Homes**
SMALHOME	1	**0.000041881**	0.00001258	3.329	0.0017	**1-6 Bed Group Homes**
SUPTLVG	1	**-0.000068114**	0.00003333	-2.044	0.0468	**Supported Living**

Table 4f.
Model 6: Independent Variables – Funding Sources.
Dependent Variable: TOTLOG Log[10] of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	5	9.71881	1.94376	76.119	0.0001
Error	45	1.14911	0.02554		
C Total	50	10.86791			

Root MSE	0.15980	R-square	0.8943
Dep Mean	8.39585	**Adj R-sq**	**0.8825**
C.V.	1.90331		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.630558	0.06978836	109.339	0.0001	Intercept
ICFFOLKS	1	**0.000201**	0.00002438	8.229	0.0001	**# ICF/MR Participants**
ICFFOLK2	1	-1.097261E-8	0.00000000	-5.247	0.0001	# ICF/MR Squared
HCBFOLKS	1	**0.000100**	0.00001507	6.654	0.0001	**# HCBS Participants**
HCBFOLK2	1	-2.522252E-9	0.00000000	-5.001	0.0001	# HCBS Squared
HCBSRATE	1	**0.000006104**	0.00000201	3.043	0.0039	**HCBS $ per Participant**

Table 5a.
Total 1996 Expenditures - Actual and Predicted by Models 1-3.

State	Total Spending (Braddock)	Model 1. Geographic	Model 2. Social/Political	Model 3. Economic	% Diff.
Alabama	$158,157,366	$212,937,777	$420,731,088	$209,328,571	132%
Alaska	$36,743,834	$64,248,334	$64,409,887	$92,350,957	251%
Arizona	$256,201,091	$160,298,443	$175,717,327	$222,481,108	87%
Arkansas	$172,110,941	$152,236,474	$169,514,738	$135,474,354	79%
California	$2,484,230,145	$1,609,291,135	$1,502,944,339	$1,824,947,280	73%
Colorado	$220,771,456	$168,330,454	$193,692,770	$229,165,432	104%
Connecticut	$639,344,755	$348,409,595	$208,097,874	$264,646,888	41%
Delaware	$64,623,443	$77,564,738	$73,233,369	$97,991,259	152%
Dist Columbia	$107,056,347	$82,208,009	$106,579,591	$97,447,175	91%
Florida	$491,116,138	$955,823,326	$1,482,416,930	$1,621,062,837	330%
Georgia	$329,765,137	$355,368,857	$437,369,233	$456,842,797	139%
Hawaii	$34,952,272	$83,767,928	$78,400,949	$110,862,834	317%
Idaho	$73,965,902	$82,591,077	$111,516,272	$102,052,620	138%
Illinois	$965,891,517	$1,799,681,142	$868,630,189	$1,357,005,568	140%
Indiana	$418,829,582	$349,178,429	$289,333,911	$325,763,801	78%
Iowa	$334,548,919	$224,493,758	$195,215,795	$161,162,481	48%
Kansas	$232,534,803	$211,485,194	$121,479,939	$154,573,964	66%
Kentucky	$135,606,928	$185,426,322	$276,433,861	$187,668,831	138%
Louisiana	$405,292,852	$329,008,174	$281,673,676	$208,633,780	51%
Maine	$149,878,820	$153,000,102	$127,304,315	$105,544,085	70%
Maryland	$362,792,397	$344,562,383	$324,175,089	$354,264,994	98%
Massachusetts	$880,490,470	$756,189,229	$451,600,072	$512,247,274	58%
Michigan	$865,825,400	$902,332,835	$986,731,753	$847,443,070	98%
Minnesota	$630,798,359	$411,785,559	$257,750,654	$287,014,630	46%
Mississippi	$162,447,218	$132,903,152	$187,482,484	$135,285,931	83%
Missouri	$353,114,358	$421,294,950	$302,313,561	$301,048,108	85%
Montana	$65,432,285	$76,721,066	$75,945,710	$94,450,575	144%
Nebraska	$112,029,562	$145,019,283	$92,831,297	$120,616,782	108%
Nevada	$40,265,431	$74,679,730	$83,470,256	$124,331,473	309%
New Hampshire	$113,356,410	$143,542,706	$112,097,493	$111,757,680	99%
New Jersey	$742,181,815	$555,719,865	$444,374,436	$888,818,070	120%
NewMexico	$126,204,681	$103,307,458	$133,274,316	$113,797,287	90%
New York	$3,407,701,732	$5,398,702,011	$2,231,172,408	$2,856,197,383	84%
North Carolina	$617,324,693	$350,998,511	$500,804,886	$436,796,843	71%
North Dakota	$87,499,616	$103,810,537	$99,602,198	$89,625,357	102%
Ohio	$1,166,479,430	$1,248,800,526	$1,329,789,157	$986,839,533	85%
Oklahoma	$248,142,564	$203,264,379	$270,433,673	$163,437,744	66%
Oregon	$211,607,685	$123,606,052	$205,810,119	$178,681,213	84%
Pennsylvania	$1,373,532,457	$1,157,885,279	$1,638,341,352	$1,236,051,779	90%
Rhode Island	$171,908,764	$147,110,715	$117,968,509	$103,815,836	60%
South Carolina	$267,315,538	$198,765,502	$209,718,110	$180,924,721	68%
South Dakota	$78,368,056	$107,355,077	$72,488,547	$92,489,601	118%
Tennessee	$333,511,875	$221,429,511	$516,429,253	$283,094,376	85%
Texas	$1,032,727,259	$1,755,810,519	$2,094,108,268	$2,261,804,892	219%
Utah	$109,597,988	$110,148,337	$122,382,062	$121,402,824	111%
Vermont	$62,728,039	$121,162,463	$97,739,475	$90,168,059	144%
Virginia	$379,995,958	$480,314,466	$484,663,754	$458,456,997	121%
Washington	$387,798,632	$244,554,367	$222,286,882	$345,486,567	89%
West Virginia	$115,199,090	$117,419,506	$207,029,096	$115,757,733	100%
Wisconsin	$496,463,031	$286,455,533	$225,119,774	$294,528,927	59%
Wyoming	$65,524,456	$68,755,786	$93,155,665	$87,186,399	133%
Totals	$22,779,987,497	$24,119,756,560	$21,375,786,361	$22,238,829,278	

Table 5b.
Total 1996 Expenditures - Actual and Predicted by Models 4-6.

State	Model 4. Daytime Setting	Model 5. Resdntl Setting	Model 6. Funding Sources	Combined Models	% Diff.
Alabama	$161,124,749	$161,972,078	$161,813,882	$221,318,024	40%
Alaska	$68,687,652	$106,905,550	$68,407,309	$77,501,615	211%
Arizona	$146,047,906	$153,346,967	$252,531,023	$185,070,462	72%
Arkansas	$179,038,155	$155,682,066	$136,028,316	$154,662,350	90%
California	$2,342,432,343	$7,316,080,744	$2,401,310,000	$2,832,834,307	114%
Colorado	$193,568,689	$155,342,289	$177,029,593	$186,188,204	84%
Connecticut	$553,839,206	$211,834,005	$263,674,753	$308,417,054	48%
Delaware	$95,650,759	$130,434,646	$94,653,650	$94,921,404	147%
Dist Columbia	$69,678,033	$128,660,567	$59,649,075	$90,703,742	85%
Florida	$474,337,277	$449,636,463	$994,089,726	$996,227,760	203%
Georgia	$391,525,559	$234,130,993	$226,726,989	$350,327,405	106%
Hawaii	$74,595,665	$124,051,974	$73,387,856	$90,844,535	260%
Idaho	$85,475,898	$129,718,187	$76,972,386	$98,054,407	133%
Illinois	$678,831,338	$1,066,954,871	$1,271,134,742	$1,173,706,308	122%
Indiana	$322,299,480	$332,965,616	$454,001,730	$345,590,494	83%
Iowa	$288,774,238	$333,226,724	$259,896,265	$243,794,877	73%
Kansas	$173,839,793	$194,210,490	$229,082,087	$180,778,578	78%
Kentucky	$153,688,608	$173,476,888	$160,546,851	$189,540,227	140%
Louisiana	$309,859,837	$438,182,417	$594,912,839	$360,378,454	89%
Maine	$88,703,692	$130,676,495	$125,061,280	$121,714,995	81%
Maryland	$371,868,332	$203,514,755	$195,165,973	$298,925,254	82%
Massachusetts	$696,490,149	$324,526,156	$558,240,382	$549,882,210	62%
Michigan	$382,769,868	$335,347,465	$661,106,372	$685,955,227	79%
Minnesota	$596,540,055	$427,844,891	$916,049,175	$482,830,827	77%
Mississippi	$191,375,509	$214,518,557	$104,551,058	$161,019,449	99%
Missouri	$213,232,253	$238,994,559	$363,637,481	$306,753,485	87%
Montana	$85,250,143	$136,315,106	$78,500,158	$91,197,126	139%
Nebraska	$132,614,492	$139,795,142	$123,279,740	$125,692,789	112%
Nevada	$83,718,851	$122,642,906	$62,124,834	$91,828,008	228%
New Hampshire	$86,266,369	$131,399,171	$119,205,906	$117,378,221	104%
New Jersey	$718,105,080	$682,662,108	$851,396,350	$690,179,318	93%
New Mexico	$128,753,550	$113,834,581	$133,655,765	$121,103,826	96%
New York	$2,432,260,811	$3,945,237,917	$3,322,907,323	$3,364,412,975	99%
North Carolina	$443,631,617	$348,982,731	$607,502,125	$448,119,452	73%
North Dakota	$86,673,164	$127,224,751	$104,818,740	$101,959,125	117%
Ohio	$1,862,327,866	$875,997,057	$972,052,440	$1,212,634,430	104%
Oklahoma	$174,087,979	$226,398,071	$308,975,414	$224,432,877	90%
Oregon	$198,627,866	$161,024,275	$155,663,891	$170,568,903	81%
Pennsylvania	$2,221,576,967	$1,313,973,829	$1,913,448,521	$1,580,212,954	115%
Rhode Island	$79,779,850	$131,823,796	$139,018,818	$119,919,587	70%
South Carolina	$405,402,025	$213,751,930	$251,244,166	$243,301,076	91%
South Dakota	$123,149,330	$131,618,887	$95,087,753	$103,698,199	132%
Tennessee	$242,200,470	$201,254,592	$219,259,943	$280,611,357	84%
Texas	$1,200,179,975	$1,369,489,308	$790,819,768	$1,578,702,122	153%
Utah	$134,035,202	$160,723,198	$132,851,128	$130,257,125	119%
Vermont	$76,771,943	$126,273,986	$96,311,476	$101,404,567	162%
Virginia	$623,261,559	$185,578,404	$203,398,296	$405,945,579	107%
Washington	$640,398,327	$104,009,521	$309,855,161	$311,098,471	80%
West Virginia	$88,031,293	$111,660,274	$109,443,660	$124,890,260	108%
Wisconsin	$665,940,014	$511,044,846	$704,965,226	$448,009,053	90%
Wyoming	$85,347,309	$122,656,263	$88,459,018	$90,926,740	139%
Totals	$22,322,667,094	$25,567,609,062	$22,773,906,415	$23,066,425,795	

Table 6a.
Model 7 - Independent Variables – Total Number of People in Residential Settings and Regions.
Dependent Variable: TOTLOG Log10 of Total Spending

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	5	9.49752	1.89950	62.375	0.0001
Error	45	1.37039	0.03045		
C Total	50	10.86791			

Root MSE	0.17451	R-square	0.8739
Dep Mean	8.39585	**Adj R-sq**	**0.8599**
C.V.	2.07851		

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	7.968504	0.05399146	147.588	0.0001	Intercept
WNC	1	-0.124772	0.07335840	-1.701	0.0959	West North Central
MT	1	-0.185205	0.07380218	-2.509	0.0158	Mountain
PA	1	-0.329999	0.09196873	-3.588	0.0008	Pacific
TOTBEDS	1	0.000087474	0.00000768	11.384	0.0001	Total Residents
TOTBEDS2	1	-1.055801E-9	0.00000000	-6.638	0.0001	Total Residents Squared

Table 6b.
Model 8 - Independent Variables – OASDI & SSI People with M.R. & Regions
Dependent Variable: BEDLOG Log10 of Total Residents

Analysis of Variance

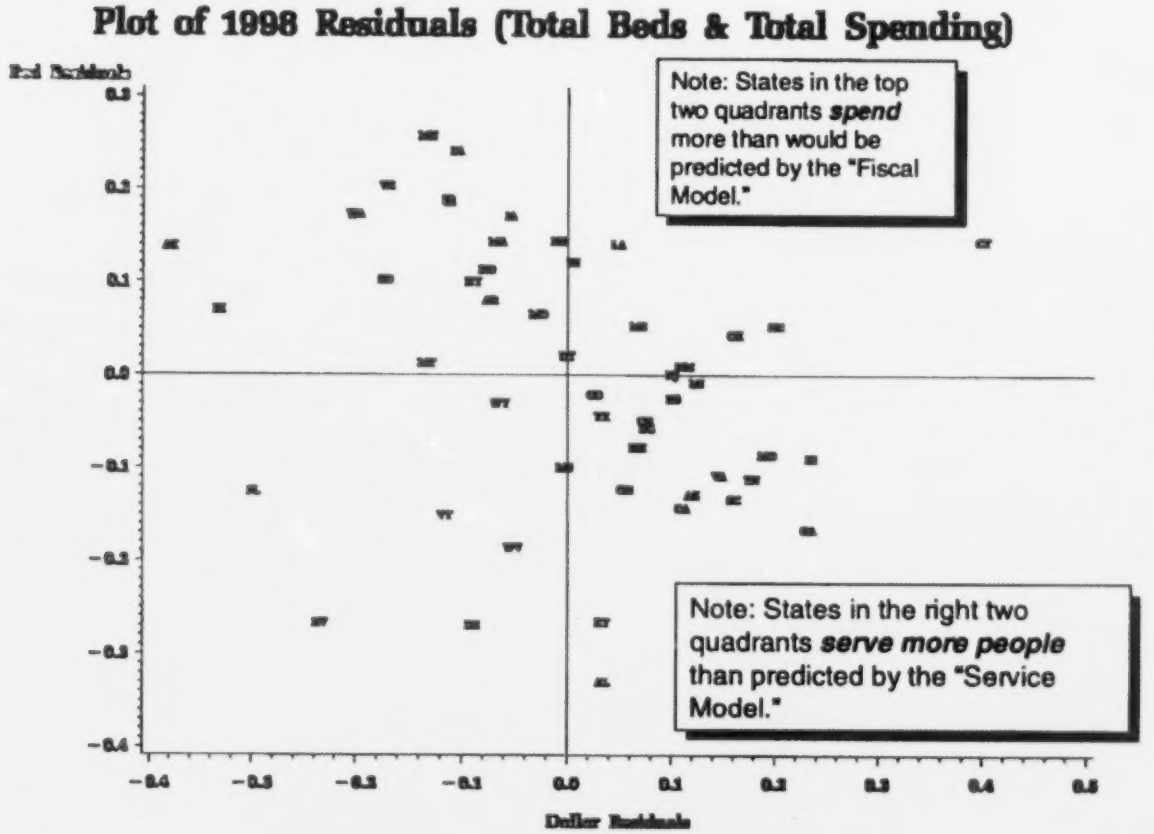
Source	DF	Sum of Squares	Mean Square	F Value	Prob>F
Model	6	7.35451	1.22575	33.946	0.0001
Error	44	1.58880	0.03611		
C Total	50	8.94332			

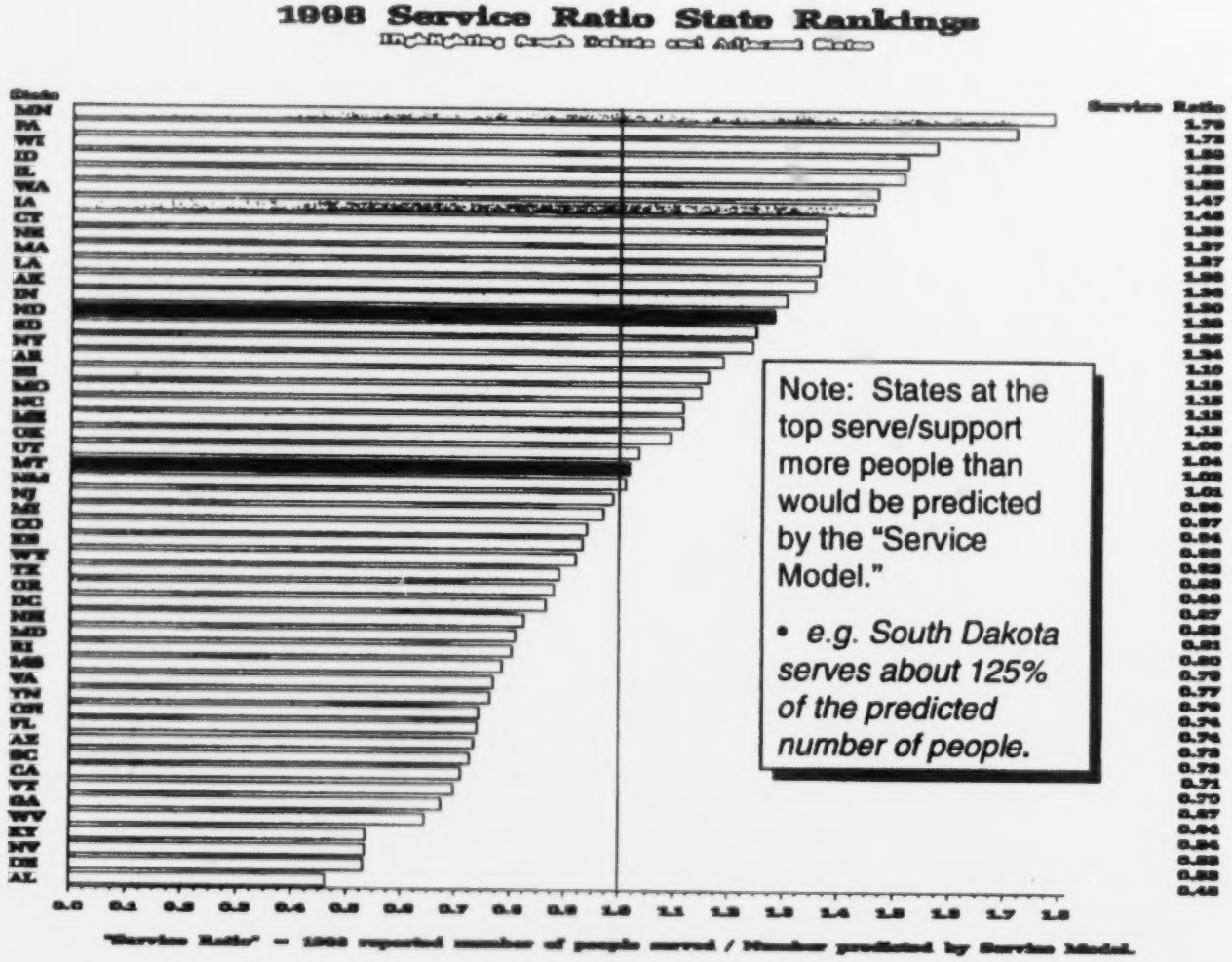
Root MSE	0.19002	R-square	0.8223
Dep Mean	3.66407	**Adj R-sq**	**0.7981**
C.V.	5.18615		

Parameter Estimates

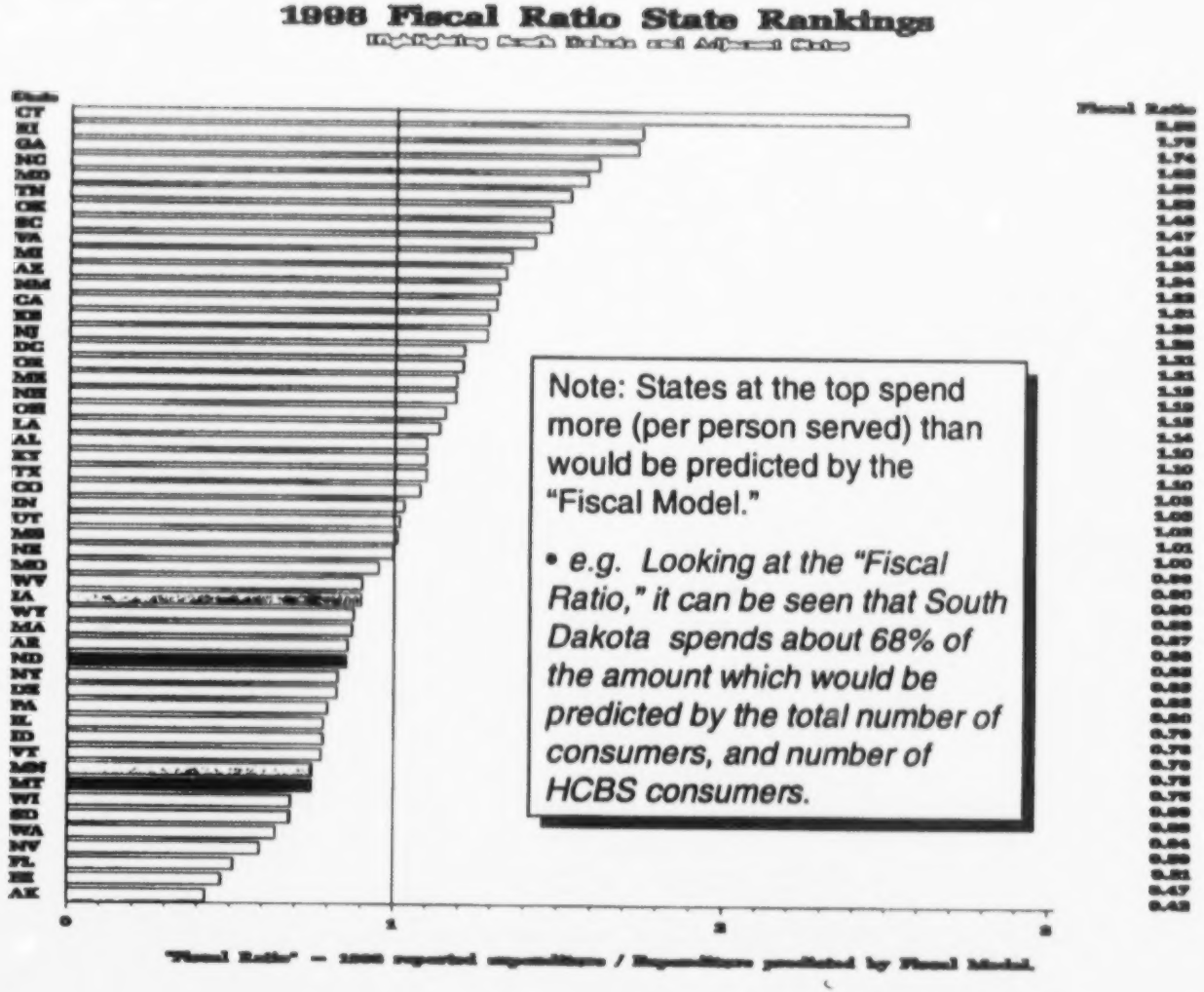
Variable	DF	Parameter Estimate	Standard Error	T for H0: Parameter=0	Prob > |T|	Variable Label
INTERCEP	1	3.159129	0.05942284	53.164	0.0001	Intercept
SA	1	-0.222849	0.07512569	-2.966	0.0049	South Atlantic
ESC	1	-0.512706	0.10828254	-4.735	0.0001	East South Central
WNC	1	0.180043	0.08214563	2.192	0.0337	West North Central
PA	1	0.170843	0.09909361	1.724	0.0917	Pacific
SSMR93	1	0.000029512	0.00000373	7.918	0.0001	OASDI/SSI MR Adults
SSMR932	1	-1.70825E-10	0.00000000	-3.904	0.0003	MR Adults Squared

Figure 1. Distribution of Residuals from Model 7, Total Spending, by Residuals from Model 8, Total Numbers of People Receiving Residential Services/Supports.




1998 Service Ratio State Rankings
Note: States at the top serve/support more people than would be predicted by the "Service Model."
• e.g. South Dakota serves about 125% of the predicted number of people.

BEST COPY AVAILABLE


1998 Fiscal Ratio State Rankings
Note: States at the top spend more (per person served) than would be predicted by the "Fiscal Model."
• e.g. Looking at the "Fiscal Ratio," it can be seen that South Dakota spends about 68% of the amount which would be predicted by the total number of consumers, and number of HCBS consumers.

REFERENCES

Braddock, D., & Hemp, R. (1997). Toward family and community: mental retardation services in Massachusetts, New England, and the United States. Mental Retardation, 35(4), 241-257.

Braddock, D., Hemp, R., Parish, S., & Westrich, J. (1998). The state of the states in developmental disabilities (5th ed.). Washington, DC: American Association on Mental Retardation.

Campbell, E. M., Fortune, J., & Heinlein, K. B. (1998). The effects of funding packages on the outcomes of integration and independence of adults with developmental disabilities in two rural states. Journal of Developmental and Physical Disabilities, 10(3), 257-281.

Campbell, E. M. & Heal, L. W. (1995). Prediction of cost, rates, and staffing by provider and client characteristics. American Journal on Mental Retardation, 100(1), 17-35.

Conway, R. N. (1992). Disability and legislation: The relationship between changing policy and changing practices. Australia and New Zealand Journal of Developmental Disabilities, 18(2), 65-73.

Gettings, R. M. (1994). The link between public financing and systemic change. In Bradley, V. J., Ashbaugh, J. W., (Eds.), et-al. Creating individual supports for people with developmental disabilities: A mandate for change at many levels (pp. 155-170). Baltimore, MD, USA: Paul H. Brookes Publishing Co.

Hand, J. E. (1994). Report of a national survey of older people with lifelong intellectual handicap in New Zealand. Journal of Intellectual Disability Research, 38(4), 275-287.

Hemp, H. (1992). Financing community services for persons with disabilities: state agency and community provider perspectives. Policy Research Brief, 4,(1), 1-9.

Institute on Disability and Human Development, University of Illinois at Chicago. (1997). 1996 FMAP Rate and State Population. Personal communication, 12/29/97.

Jacobson, J. W. (1991). Administrative and policy dimensions of developmental disabilities services. In Matson, J. L., Mulick, J. A., & et-al. (Eds.). Handbook of mental

retardation. Pergamon general psychology series. (Vol. 121. 2nd Edition., Pp. 3-22). New York, NY, USA: Pergamon Press, Inc.

Kim, S., Larson, S. A., & Lakin, K. C. (1999). Behavioral outcomes of deinstitutionalization for people with intellectual disabilities: a review of studies conducted between 1980 and 1999. Policy and Research Brief, 1(10), 1-12.

Lakin, K. C., Polister, B., Prouty, R. W. (1997). Utilization and expenditures for Medicaid institutional and home and community based services. In R. W. Prouty & K. C., Lakin (Eds.), Residential services for persons with developmental disabilities: Status and Trends through 1997. Minneapolis: University of Minnesota, Research and Training Center on Community Living, Institute on Community Integration.

Lewis, D. R., & Bruininks, R. H. (1994). Costs of community-based residential and related services to individuals with mental retardation and other developmental disabilities. In Hayden, M. F., & Abery, B. H. (Eds.), Challenges for a service system in transition: Ensuring quality community experiences for persons with developmental disabilities (pp. 231-263). Baltimore, MD, USA: Paul H. Brookes Publishing Co.

Massey, P. S., & McDermott, S. (1996). State-specific rates of mental retardation – United States, 1993. Morbidity and Mortality Weekly Report, 45(03), 61-65. Atlanta, Center for Disease Control.

Marcenko, M. O., & Meyers, J. C., (1994). How families of children with severe disabilities choose to allocate a cash subsidy. Journal of Mental Health Administration, 2(3), 253-261.

Mitchell, D. (1999). (Managed care & developmental disabilities: Reconciling the realities of managed care with the individual needs of persons with disabilities. Homewood, Illinois, USA: High Tide Press, Inc.

Smith, G. A., & Gettings, R. M. (1997). The Medicaid home and community-based waiver program: Recent and emerging trends in serving people with developmental disabilities.

Alexandria, VA: National Association of State Directors of Developmental Disabilities Services, Inc.

Smith, G. A. (1994). Paying for supports: Dollars, payments, and the new paradigm. In Bradley, V. J. (Ed), Ashbaugh, J. W. (Ed); et-al. Creating individual supports for people with developmental disabilities: A mandate for change at many levels. (pp. 481-490). Baltimore, MD, USA: Paul H. Brookes Publishing Co.

Smith, G. A. (1999a). Wyoming DOORS: Setting IRAs for HCB Waiver Services. Policy and Practice Brief, February 5, 1999. Alexandria, VA, USA: National Association of State Directors of Developmental Disabilities Services, Inc.

Smith, G. A. (1999b). Closing the gap: addressing the needs of people with developmental disabilities waiting for supports. Alexandria, VA. USA. National Association of State Directors of Developmental Disabilities Services, Inc.

Smith, G. A. (1999c). Variations in HCB Waiver Per Capita Costs , December 17, 1999. Waiver Wire 99-12. Alexandria, VA, USA. National Association of State Directors of Developmental Disabilities Services, Inc.

Smith, G. A., Prouty, R., & Lakin, C. K. (1996). The HCB Waiver Program: The fading of Medicaid's "institutional bias." Mental Retardation, 34(4), 262-263.

U.S. Bureau of the Census. (1998). 1990 to 1997 annual time series of state population estimates by age and sex, table 9. Report ST-97-5, July 21, 1998. [On-line]. Available: http://www.census.gov/population/estimates/state/97agesex.txt & http://www.census.gov/population/estimates/state/97agesex.txt

West, M. D. (1995). Common sense is alive and well: Comments on Erb (1995). Mental Retardation, 33(6), 400-402.

Zald, M. N. & McCarthy, J. D. (1987). Social movements in an organizational society. New Brunswick: Transaction Publishers, Inc.